



## **Reinforcement Guidelines Study update**

The objective of this study was to ensure that the impacts of the proposed Reinforcement Guidelines were identified across the ATC transmission system. To identify potential reliability and cost impacts, ATC screened the transmission system per the following guidelines:

Based on NERC reliability standards, ATC's Planning Criteria and past practices, ATC will generally reinforce for the following limiting BES and non-BES scenarios:

- TPL-001-0.1: NERC Category A (System Intact): Instability, cascading, or voltage and flows outside appropriate limits. Planning to shed load is not an acceptable mitigation procedure.
- TPL-002: NERC Category B (Single Contingencies): Instability, cascading, or voltage and flows outside appropriate limits. Planning to shed load is not an acceptable mitigation procedure.
- TPL-003: NERC Category C (Select Multiple Contingencies): Voltage collapse, cascading, or unplanned/uncontrolled load loss. Voltage and flows outside appropriate limits need to be mitigated. Pre-contingency economic generation redispatch may be appropriate mitigation. Planning to shed load can be an acceptable mitigation procedure.
- Prior Maintenance plus Category B: At appropriate maintenance period load levels, instability, cascading, or voltage and flows outside appropriate limits - planning to shed load is not an acceptable mitigation procedure.

Generally, there are circumstances under which the risk of a multiple contingency event to ATC and its customers may be sufficiently severe and may warrant reinforcement or other mitigation consideration:

- Generator instability for Category C, D2, and D3,
- Loss of load exceeds 300 MW,
- Loss of load between 100 and 300 MW, examine specific situations,
- Loss of load is less than 100 MW, examine specific situations, if controlled load shed is feasible reinforcement may not be justified, and
- Prior maintenance + Category C when planned or controlled loss of load exceeds 300 MW.

As part of the screening process, several scenarios were analyzed in order to identify potential impacts:

- a) NERC Category C3 (NERC Category B + System Adjustments + NERC Category B),
- b) NERC Category C1, C2, and C5, and
- c) NERC Category B.



The powerflow cases used for this screening were from the 2012 10-Year Assessment and included the 2022 Summer Peak and 2022 70% Load West-to-East Flow bias (off-peak), adjusted for the maintenance load level. In the off-peak model, prior maintenance outages were studied as well.

This screening was completed as part of the 2013 10-Year Assessment based on the Summer Emergency Rating (Rate B). The amount of load at risk was determined and separated into three categories: less than 100 MW load at risk, 100-300 MW load at risk, and greater than 300 MW load at risk. The results are summarized in Table 1 and Table 2 for the Summer Peak and Off-Peak cases, respectively.

*Table 1*  
*2022 Summer Peak, Number of Outage Type Combinations and Load at Risk*

Outage type	>300 MW load at risk	100-300 MW load at risk	<100 MW load at risk
A and B	0	0	0
C1 and C2	0	0	18
C3	5	24	152
C5	1	0	3
Total	6	24	173

*Table 2*  
*2022 Off-Peak, Number of Outage Type Combinations and Load at Risk*

Outage type	>300 MW load at risk	100-300 MW load at risk	<100 MW load at risk
A and B	0	0	0
Prior + B	0	15	18
Prior + C1/C2	2	19	152
Prior + C5	2	6	3
Total	4	40	173

After discussion with ATC stakeholders and management, it was determined that preliminary solutions would be developed for outages where studies indicated that more than 300 MW of load was at risk. Associated cost impacts to address these needs were also developed. Examples of projects that could address the identified outages are summarized in Table 3.



*Table 3*  
*Examples of Potential Projects to Address >300 MW Load Lost*

Potential Project	Outage type	Cost estimate (M)
Rebuild Y-54 Paddock-Shaw 69 kV line	Prior + C1	\$10
Rebuild Y-153 Colley Road-Shaw 69 kV line	Prior + C1	\$10
Uprate Maple-Saukville 138 kV line	Prior + C5	\$5
New Hilltop-Pine 115 kV line	C3	\$40
Total		\$65

These results are for information only. At this time, ATC is proposing no projects to address the identified issues.

Phase 2 of this effort will be to screen at the Summer Normal Rating (Rate A) for the same scenarios described above. The Phase 2 analysis will be performed as part of the 2014 10-Year Assessment. As in the screening performed in the 2013 Assessment, prior maintenance considerations will be taken into account in the off-peak scenario.

The final phase of this effort will be performed in the 2015 Assessment and will involve a review and possible update of ATC's Planning Criteria. Further discussion with ATC's stakeholders, management, and engineering personnel will determine whether to move forward with adjusting the Planning Criteria to account for Reinforcement Guidelines.